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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/469,406	12/22/1999	ALI KESHAVARZI	042390.P7511	4937

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ALOYSIUS T C AUYEUNG
BLAKLEY SOKOLOFF TAYLOR & ZAFMAN LLP
12400 WILSHIRE BOULEVARD 7TH FLOOR
LOS ANGELES, CA 90005

EXAMINER

KANG, DONGHEE

ART UNIT PAPER NUMBER

2811

DATE MAILED: 01/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/469,406

Applicant(s)

KESHAVARZI ET AL.

Examiner

Donghee Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Acknowledgment

1. Applicant's Response to Paper No.16 has been entered and made of Record (Paper No.17). Claims 29-50 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims **29, 32-35, 40-42 & 46-50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (Fig1) in view of Manning et al. (US 5,962,887).

Regarding claim **29**, APA teaches a die, comprising (Fig.1):

a first conductor (Vg) carrying a ground voltage; a second conductor (Vd) carrying a power supply voltage; and a semiconductor decoupling capacitor to provide decoupling capacitance between the first and second conductors, the semiconductor decoupling capacitor including:

a gate electrode coupled to the first conductor (Vg) to receive the ground voltage; a diffusion coupled to the first conductor to receive a power supply voltage, and a body to receive the power voltage through the diffusion, the semiconductor decoupling capacitor thereby being in inversion mode.

APA does not teach that the first conductor coupled to the gate electrode carries a power supply voltage and a second conductor coupled to the diffusion carries a

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ground voltage, the semiconductor decoupling capacitor thereby being in depletion mode.

Manning et al. teach that the MOS FET devices are capable of being used as a capacitor. Such MOS capacitor has a top plate comprising the conductively doped polysilicon gate. The bottom plate comprises the lightly doped semiconductor substrate. The bottom plate comprises a lightly doped semiconductor substrate which has distinct regions of operation: accumulation, depletion, and inversion. These regions of operation are defined by the voltage applied to the MOS capacitor. See Col.1, line 52 – Col.2, line 50. Manning et al. also teach that depletion mode MOS capacitor increases the useful voltage range of the capacitor, optimizing operation at low supply voltage (see abstract). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the MOS capacitor of APA (Fig.1) in depletion mode as taught by Manning et al. since such depletion mode MOS capacitor increases the useful voltage range of the capacitor, optimizing operation at low supply voltage.

Furthermore, claims directed to apparatus must be distinguished from the prior art in the terms of structure rather than function. In re Danly, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). “[A]pparatus claims cover what a device is, not what a device does.” (emphasis in original) Hewlett-Packard Co.v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from

a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding claims **30 & 31**, APA (Fig.1) teaches the gate electrode is p-type and the diffusion and the body are n-type, with the diffusion being more heavily doped than the body.

Regarding claim **32**, APA (Fig.1) teaches that the diffusion is a first diffusion and the semiconductor decoupling capacitor further includes a second diffusion coupled to the second conductor to receive a power voltage and wherein the body receives the power ground voltage through the first and second diffusions,

Regarding claims **33-34**, APA (Fig.1) teaches that the first and second diffusions are source/drain diffusions,

wherein the first and second diffusion are more heavily doped than the body.

Regarding claims **35 & 39**, APA (Fig.1) teaches the semiconductor capacitor having a flatband voltage but does not teach the power supply voltage has a smaller absolute value than does the flatband voltage. However, it is conventional to have the power voltage which has a smaller absolute value than does the flatband voltage to obtain depletion mode (see also Fig.3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply power voltage having smaller absolute value than does the flatband voltage since it is requested to have small power voltage than flatband voltage to obtain depletion mode.

Regarding claim **36**, APA (Fig.1) teaches that the gate electrode is p-type and the diffusion and the body are n-type, and wherein the diffusion is a body tap diffusion

and the semiconductor decoupling capacitor further first and second source/drain diffusion that are p-type.

Regarding claim **37**, APA (Fig.1) teaches that the first and second source/drain diffusions are coupled to the second conductor to receive the power voltage but not receive the ground voltage.

Regarding claim **38**, APA (Fig.1) teaches that the body tap diffusion and first and second source/drain diffusions are heavily doped than the body.

Regarding claim **40**, APA teaches a die, comprising (Fig.9):

a first conductor carrying a power supply voltage; a second conductor carrying a ground voltage; and a semiconductor decoupling capacitor to provide decoupling capacitance between the first and second conductor, the semiconductor decoupling capacitor including:

a gate electrode coupled to the second conductor to receive the ground voltage; a diffusion coupled to the first conductor to receive the power supply voltage, a body to receive the ground voltage through the diffusion, the semiconductor decoupling capacitor thereby being in inversion mode.

APA does not teach that the first conductor coupled to the diffusion carries a power supply voltage and a second conductor coupled to the gate electrode carries a ground voltage, the semiconductor decoupling capacitor thereby being in depletion mode.

Manning et al. teach that the MOS FET devices are capable of being used as a capacitor. Such MOS capacitor has a top plate comprising the conductively doped

polysilicon gate. The bottom plate comprises the lightly doped semiconductor substrate. The bottom plate comprises a lightly doped semiconductor substrate which has distinct regions of operation: accumulation, depletion, and inversion. These regions of operation are defined by the voltage applied to the MOS capacitor. See Col.1, line 52 – Col.2, line 50. Manning et al. also teach that depletion mode MOS capacitor increases the useful voltage range of the capacitor, optimizing operation at low supply voltage (see abstract). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the MOS capacitor of APA (Fig.1) in depletion mode as taught by Manning et al. since such depletion mode MOS capacitor increases the useful voltage range of the capacitor, optimizing operation at low supply voltage.

Furthermore, claims directed to apparatus must be distinguished from the prior art in the terms of structure rather than function. In re Danly, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). “[A]pparatus claims cover what a device is, not what a device does.” (emphasis in original) Hewlett-Packard Co.v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding claim 41, APA (Fig.9) teaches that the gate electrode is n-type and the diffusion and the body are p-type.

Regarding claim **42**, APA (Fig.9) teaches that the gate electrode is n-type and the diffusion and the body are p-type, with the diffusion being more heavily doped than the body.

Regarding claim **43**, APA (Fig.9) teaches that the diffusion is a first diffusion and the semiconductor decoupling capacitor further includes a second diffusion coupled to the first conductor to receive the ground voltage and wherein the body receives the ground voltage through the first and second diffusions.

Regarding claim **44**, APA (Fig.9) teaches that the first and second diffusions are source/drain diffusions.

Regarding claim **45**, APA (Fig.9) teaches that the first and second diffusions are more heavily doped than the body.

Regarding claims **46 & 50**, APA (Fig.9) does not teach that the semiconductor decoupling capacitor has a flatband voltage and wherein the power supply voltage has a smaller absolute value than does the flatband voltage. However, it is conventional to have the power voltage which has a smaller absolute value than does the flatband voltage to obtain depletion mode (see also Fig.3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply power voltage having smaller absolute value than does the flatband voltage since it is requested to have smaller power voltage than flatband voltage to obtain depletion mode.

Regarding claim **47**, APA (Fig.9) teaches that the gate electrode is n-type and the diffusion and the body are p-type, and wherein the diffusion is a body tap diffusion

and the semiconductor decoupling capacitor further includes first and second source/drain diffusions that are n-type.

Regarding claim **48**, APA (Fig.9) teaches that the first and second source/drain diffusions are coupled to the second conductor to receive the ground voltage.

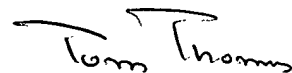
Regarding claim **49**, APA (Fig.9) teaches that the body tap diffusion and the first and second source/drain diffusions are more heavily doped than the body.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

dhk
January 16, 2003